SUPERIOR RIVERS WATERSHED ASSOCIATION

Watershed Report Card 2021

TYLER FORKS RIVER WATERSHED

What is a watershed?

A watershed is an area of land where all the water, streams, and rainfall flow to a common outlet such as a lake. Everything within a watershed is connected, and all actions that affect the water upstream affect the water downstream.

The **Tyler Forks River** is a sub-watershed of the **Bad River Watershed**; it is one of six sub-watersheds.

The Tyler Forks River is a sub-watershed of the entire Bad River Watershed.

What do we measure in a report card?

Our watershed report cards use data collected by volunteers from **macroinvertebrate samples** and **chemistry samples**. Macroinvertebrates are aquatic organisms, many of which are insects, and each species tolerates varying amounts of pollution. The tolerance of those species gives us a score that can be used to grade a site's water quality. Our water chemistry kits measure temperature, pH, dissolved oxygen, turbidity, and chloride.

Why measure water quality?

Measuring water quality helps us better understand our land, water, and people. By measuring water quality, we can:

- Identify important fish breeding habitat
- Determine where restoration work is needed
- Determine human impact on water
- Track our progress protecting water resources
- Become better informed stewards of our waters

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Caring for Our Corner of the Earth
Natural Resources FOUNDATION of Wisconsin

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The Tyler Forks River
Macroinvertebrate Monitoring: Summary

What are macroinvertebrates?

Macroinvertebrates are aquatic organisms. Most often they are the larvae of insects that we recognize such as damselflies and dragonflies. They are near the bottom of the food web, serving as food for fish and many other species. They are an important link in cycling nutrients through the ecosystem.

Why do we monitor them?

Macroinvertebrates vary in their tolerance of water pollution, some thriving only in pristine waters while others can tolerate highly polluted water. The number and types of macroinvertebrates therefore give us a good indication of pollution in a stream.

How do we measure?

We measure our macroinvertebrate monitoring using the Hilsenhoff Biotic Index value, or HBI for short. The HBI is an index of pollution tolerance developed by William Hilsenhoff (UW-Madison) in 1977.

We collect samples of macroinvertebrates from streams and rivers of interest, identify, and count all of the organisms in the sample. Each aquatic macroinvertebrate species has a predetermined tolerance to pollution which we use to calculate the HBI score. The resulting number tells us the overall average tolerance value of the macroinvertebrates in the stream. This tolerance value corresponds to the degree of organic pollution in that stream, as indicated on the chart to the right. Organic pollution includes a variety of pollutants that come from sources such as agricultural runoff and malfunctioning domestic waste water treatment systems.

HBI data provide a good first look at water quality conditions in a stream and can help identify areas where follow-up testing may be needed to identify potential pollution issues.

HBI Value	Water Quality	Degree of Organic Pollution
0.00-3.50	Excellent	No apparent organic pollution
3.51-4.50	Very Good	Slight organic pollution
4.51-5.50	Good	Some organic pollution
5.51-6.50	Fair	Fairly significant organic pollution
6.51-7.50	Fairly Poor	Significant organic pollution
7.51-8.50	Poor	Very significant organic pollution
8.51-10.00	Very Poor	Severe organic pollution

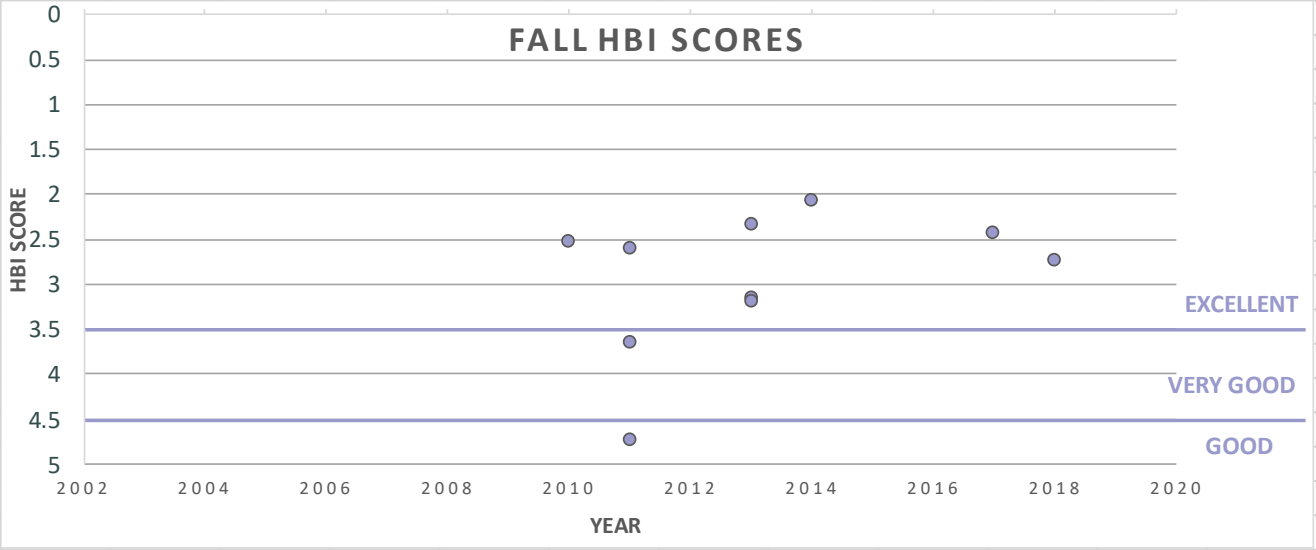
What did we find?

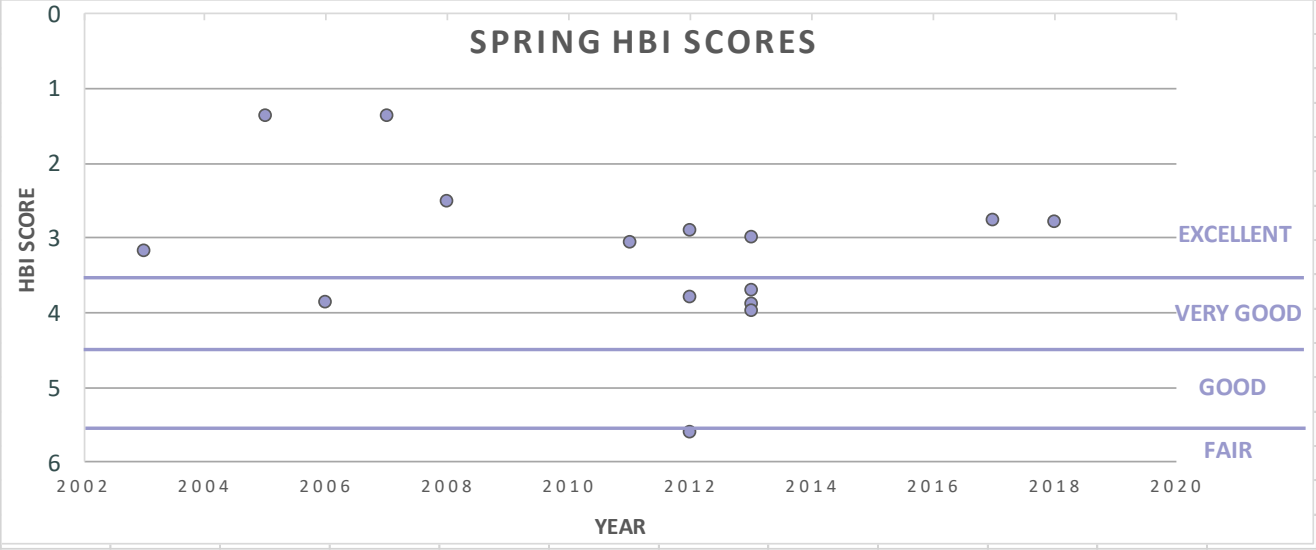
- Tyler Forks River appears to be in very good to excellent water quality based on HBI scores.
- HBI scores during the fall were more consistent. This may be due to macroinvertebrates at a different life cycle during the spring.
- More sampling is required in this watershed to achieve our 4-year data baselines.

A Special Note on HBI and Organic Pollution

HBI scores can sometimes be affected by natural conditions. Areas with a lot of wetland or areas downstream in bigger rivers may not have the kind of habitat that was intended for use with the HBI, and is sometimes why some sites test poorly. Other types of water quality indicators may be more useful in locations like this.

The Tyler Forks River
Macroinvertebrate Monitoring: Data





Site	Data Years	4 Year Baseline Achieved?	Mean HBI Score*	Number of Samples	Range	Quality
Will Road	2003—2013	Yes	3.32	8	1.36—5.6	Excellent
Highway 77	2010—2014	Yes	2.64	7	2.06—3.05	Excellent
Shirley Lake Road	2011—2013	No	3.55	4	3.16—3.79	Very Good
Caroline Lake Road	2013—2018	No	2.92	5	2.43—3.88	Excellent
Stricker Road	2013	No	3.19	1	-	Excellent

*based on samples of 100 specimens or more

The Tyler Forks River
Chemistry Monitoring: Summary

What do we monitor?

We monitor several physical and chemical indicators of water quality. These include **temperature**, **pH**, **dissolved oxygen**, **turbidity**, and **chloride.**

Temperature (degrees Celsius) is the water temperature.
pH (standard units) is a scale from 0 to 14, in which 7 is neutral, used to specify the acidity or alkalinity of a liquid.
Dissolved Oxygen (milligrams per liter) (or DO) is a measure of the concentration of oxygen that is dissolved in water.
Turbidity (Jackson Turbidity Unit) is a measurement of the cloudiness of a fluid caused by particles.
Chloride (milligrams per liter) is a naturally occurring chemical, often found as a component of road salt (sodium chloride).

Why do we monitor them?

Each of these indicators directly impacts the characteristics of a body of water in a variety of ways.

Trout and other up-stream breeding fish require cold **temperatures**, because cold water holds more oxygen which they require. Natural **pH** levels may vary between water bodies, but most aquatic animals and plants have adapted to life within a specific pH range, and variation can affect such things as the hatching success of fish eggs, reduce amphibian numbers due to increased acidity, or increase levels of toxic metals in water. Fish species such as trout require higher levels of **dissolved oxygen (DO)** than some other fish, making DO a very important indicator of fish habitat quality. High **turbidity** may reduce light penetration, negatively affecting aquatic plants and algae, and also indicate increased erosion and sedimentation. Sedimentation negatively impacts macroinvertebrate and fish spawning habitat. While **chloride** is naturally occurring, in high levels it negatively affects the physical water balance in aquatic organisms.

What did we find?

- By the time of this report, only 2 sites had reached our 4 year baseline, although one site was close.
- Our data confirms that Tyler Forks River is still a cold system ideal for trout and other cold water species.
- Most monitoring sites across the watershed have levels of dissolved oxygen, pH, turbidity, and chloride which are optimal for cold water species.
- In general, the watershed's turbidity (or clearness) is very clear, but is slightly less clear than the optimal range for trout.

The Tyler Forks River
Chemistry Monitoring: Data

What do these numbers mean?

Temperature—Degrees Celsius
Water temperature is an important factor in fish habitat quality. For example, brook trout's optimum temperature range is 8.9 to 18.3 C° (48 to 65 F°), while northern pike's optimum temperature range is 12.8 to 23.9 C° (55 to 75 F°) and bullheads can exist in temperatures as high as 26.66 C° (80 F°).

pH — Standard Units (SU)
The pH level affects all aquatic organisms. Species vary in their tolerance of water acidity levels. For example, many plants and algae thrive at a pH range of 6.7 to 12.0, while amphibians require a range of 4.5 to 6.5. Mayflies and trout do best at a pH range of 6.7 to 8.6.

Dissolved Oxygen (DO) — Milligrams per Liter
Although the fish in our region differ in their dissolved oxygen requirements, an overall range of 4.0 to 8.0+ is optimal. Trout have an optimal DO range of 8.0+, whereas bullheads can exist in water with DOs as low as 0.2.

Turbidity—Jackson Turbidity Units (JTU)
Turbidity is measured in Jackson Turbidity units (or JTU). In surface water, less than 10 JTU is considered normal background turbidity. Trout, a cold water fish that is less tolerant of turbidity, has an optimal range of 0.9 to 1.5 JTU.

Chloride — Milligrams per Liter
Chloride, such as salt, is naturally occurring but can also become too concentrated. 0 to 100 milligrams per liter is considered a natural level in surface water, while public drinking must be under 250 milligrams per liter. Chloride is especially of concern because of heavy road salt use or septic system runoff. Chloride of roughly 500 milligrams per liter and above can negatively affect wild rice.

Site	Data Years	Temperature (° C)			Dissolved Oxygen (mg/l)			pH			Turbidity (JTU)			Chloride (mg/l)		
		Mean	# of Samples	Range	Mean	# of Samples	Range	Mean	# of Samples	Range	Mean	# of Samples	Range	Mean	# of Samples	Range
Will Road	2004-2015	10.9	102	0 - 24.5	9.0	96	5.0 - 12.4	7.1	96	6.4-7.8	3.4	86	0 - 12.5	7.8	96	2.0 - 20.0
Shirley Lake Road	2011-2015	7.4	26	0 - 27.5	8.5	28	5.8 - 10.8	7.0	27	6.4 - 7.5	2.5	28	1.0 - 4.0	6.0	25	4.0 - 8.0
Highway 77	2011-2018	9.8	42	0 - 19.0	7.9	41	3.0 - 11.8	6.8	42	6.0 - 7.5	2.9	42	0 - 10.0	6.5	42	2.0 - 12.0
Forest Road 703	2013	14.9	5	12.0 - 19.0	6.2	5	5.0 - 7.0	6.3	5	6.0 - 6.7	7.6	5	3.0 - 15.0	4.0	5	4.0 - 5.0
Casey Sag Road	2012-2018	12.6	63	0 - 19.0	7.8	64	5.2 - 11.6	6.7	64	5.8 - 7.0	2.9	63	0 - 20.0	13.0	64	4.0 - 36.0
Caroline Lake Road	2012	10.2	1	-	9.0	1	-	6.5	1	-	2.0	1	-	5.0	1	-

Volunteers

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References and Further Reading

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